

```
import numpy as np
```

▼ 1D Array

```
a = np.array([1,2,3,4,5])  
a
```

```
array([1, 2, 3, 4, 5])
```

```
a.shape
```

```
(5,)
```

```
len(a)
```

```
5
```

```
a.ndim
```

```
1
```

```
a.size
```

```
5
```

```
a.dtype
```

```
dtype('int64')
```

```
a1 = np.zeros(6)
```

```
a1
```

```
array([0., 0., 0., 0., 0., 0.])
```

```
a2 = np.ones(6)
```

```
a2
```

```
array([1., 1., 1., 1., 1., 1.])
```

▼ Arithmetic Operations

▼ Addition

```
a = np.array([1,2,3,4,5])
```

```
b = np.array([6,7,8,9,10])
```

```
a + b
```

```
array([ 7,  9, 11, 13, 15])
```

```
a - b
```

```
array([-5, -5, -5, -5, -5])
```

▼ Multiplication

```
a * b
array([ 6, 14, 24, 36, 50])
```

▼ Division

```
a / b
array([0.16666667, 0.28571429, 0.375      , 0.44444444, 0.5      ])

np.exp(b)
array([ 403.42879349, 1096.63315843, 2980.95798704, 8103.08392758,
       22026.46579481])

np.sqrt(b)
array([2.44948974, 2.64575131, 2.82842712, 3.      , 3.16227766])

np.sin(a)
array([ 0.84147098,  0.90929743,  0.14112001, -0.7568025 , -0.95892427])

np.cos(b)
array([ 0.96017029,  0.75390225, -0.14550003, -0.91113026, -0.83907153])

np.log(a)
array([0.      , 0.69314718, 1.09861229, 1.38629436, 1.60943791])
```

▼ Comparison

```
a == b
array([False, False, False, False, False])

a > 2
array([False, False,  True,  True,  True])
```

▼ Aggregate Functions

```
a.sum()
15

a.min()
1

a.max()
5

a.cumsum()
```

```

array([ 1,  3,  6, 10, 15])

a.mean()

3.0

np.corrcoef(a,b)

array([[1., 1.],
       [1., 1.]])

np.std(a)

1.4142135623730951

```

▼ 2D Array

▼ Arithmetic Operations

```

a = np.array([[1,2,3],[4,5,6]])
b = np.array([[7,8,9],[10,11,12]])
a + b

array([[ 8, 10, 12],
       [14, 16, 18]])

a - b

array([[ -6,  -6,  -6],
       [ -6,  -6,  -6]])

a * b

array([[ 7, 16, 27],
       [40, 55, 72]])

a / b

array([[0.14285714, 0.25      , 0.33333333],
       [0.4       , 0.45454545, 0.5       ]])

np.exp(b)

array([[ 1096.63315843,  2980.95798704,  8103.08392758],
       [ 22026.46579481,  59874.1417152 , 162754.791419  ]])

np.sqrt(b)

array([[2.64575131, 2.82842712, 3.       ],
       [3.16227766, 3.31662479, 3.46410162]])

np.sin(a)

array([[ 0.84147098,  0.90929743,  0.14112001],
       [-0.7568025 , -0.95892427, -0.2794155 ]])

np.cos(b)

array([[ 0.75390225, -0.14550003, -0.91113026],
       [-0.83907153,  0.0044257 ,  0.84385396]])

np.log(a)

array([[0.       , 0.69314718, 1.09861229],
       [1.38629436, 1.60943791, 1.79175947]])

```

▼ Comparison

```
a == b
array([[False, False, False],
       [False, False, False]])

a < 2
array([[ True, False, False],
       [False, False, False]])

np.array_equal(a,b)

False
```

▼ Aggregate Functions

```
a.sum()

21

a.min()

1

a.max()

6

a.cumsum()

array([ 1,  3,  6, 10, 15, 21])

a.mean()

3.5

# correlation coefficient
np.corrcoef(a,b)

array([[1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.],
       [1., 1., 1., 1.]])

np.std(a)

1.707825127659933
```

▼ 3D Array

Arithmetic Operation

▼ Addition

```
a = np.array([[[1,2],[3,4],[5,6]]])
b = np.array([[[7,8],[9,10],[11,12]]])
a + b
```

```
array([[[ 8, 10],
        [12, 14],
        [16, 18]])])
```

▼ Subtraction

a - b

```
array([[[ -6, -6],
        [-6, -6],
        [-6, -6]])])
```

▼ Multiplication

a * b

```
array([[[ 7, 16],
        [27, 40],
        [55, 72]])])
```

▼ Division

a / b

```
array([[[0.14285714, 0.25      ],
        [0.33333333, 0.4       ],
        [0.45454545, 0.5       ]]])
```

np.exp(b)

```
array([[[ 1096.63315843,  2980.95798704],
        [ 8103.08392758, 22026.46579481],
        [ 59874.1417152 , 162754.791419  ]]])
```

np.sqrt(b)

```
array([[[2.64575131, 2.82842712],
        [3.         , 3.16227766],
        [3.31662479, 3.46410162]])])
```

np.sin(a)

```
array([[[ 0.84147098,  0.90929743],
        [ 0.14112001, -0.7568025 ],
        [-0.95892427, -0.2794155  ]]])
```

np.cos(b)

```
array([[[ 0.75390225, -0.14550003],
        [-0.91113026, -0.83907153],
        [ 0.0044257 ,  0.84385396]])])
```

np.log(a)

```
array([[[0.         , 0.69314718],
        [1.09861229, 1.38629436],
        [1.60943791, 1.79175947]])])
```

▼ Comparison

a == b

```
array([[[False, False],
        [False, False],
        [False, False]])])
```

```
a > 2  
  
array([[False, False],  
       [ True,  True],  
       [ True,  True]])
```

▼ Aggregate Functions

```
a.sum()  
  
21  
  
a.min()  
  
1  
  
a.max()  
  
6  
  
a.cumsum()  
  
array([ 1,  3,  6, 10, 15, 21])  
  
a.mean()  
  
3.5  
  
np.std(a)  
  
1.707825127659933
```

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